# INSTRUCTION MANUAL

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# TWO LEVEL INCUBATOR SHAKER USER'S MANUAL

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Thank you very much for choosing ZHWY-2102/2112 series Two Layers Incubator Shakers. To ensure a smooth operation of this unit, we would like to ask you to read this instruction manual thoroughly, and always operate the machine as guided by this manual. Also keep this manual with the unit for maintenance reference. In case you meet problems with this unit, please feel free to contact Laboratory Equipment Pty Ltd. We will help you identify the problem and provide trouble-shooting service for you.

## 1. Safety Instructions

1. The unit must be properly wired to ensure safety either to the operator or facilities. It is recommended to use dedicated line to avoid interference from other equipment.
2. Please verify the local electric power supply is in accordance with the electrical requirement **240V 50/60Hz** of the unit.
3. Do not use extra power cords or lines for this unit, do not bend, entangle or twist the power cord, or apply excessive tension to it, otherwise it may cause damage to the unit or result in electrical shock or fire.
4. Do not touch the unit with wet hands or insert other items into the wind inlet when the unit is running. It may cause a fire or electrical shock.
5. Do not move the unit when it is operating.
6. In case moving the unit is necessary, please be sure the unit is kept upright. Otherwise, it may cause damage to the refrigeration system inside.
7. It is good practice to ensure that the shaking platform comes to a complete standstill before open the door of the chamber.
8. When opening or closing the chamber door, please handle with care, do not use too much force.
9. In case fuse has to be replaced, the electric power supply has to be cut off.
10. The unit must be placed on solid, flat floors near a grounded electrical outlet, allow sufficient clearance on all sides of the unit, at least 20cm, for proper ventilation. Avoid locations under direct sunlight or near heat producing equipments such as an oven.
11. After continuous refrigeration for 10 days, it is good practice to de-damp the unit by turning on the heating function.
12. Regular check to the flask clamps is necessary to ensure they are in good status.
13. Frequent opening of the chamber door is not recommended as this may affect the temperature recovery.
14. The unit must be kept away from volatile, flammable, explosive liquids or gases. This may cause damages either to the unit or property losses includes facilities and buildings.
15. In case of malfunction or burning smell, the unit must be immediately ceased for checking.
16. If a thunderstorm approaches in the distance, immediately turn off the power. Lightning from the storm may cause fire or electrical shock.
17. The above safety instructions must be followed during the operation of the unit. All persons operating this unit should review this manual. No compensation or claim can be made against the manufacturer if damage is caused to the personnel or facilities that result from the improper use of this unit.

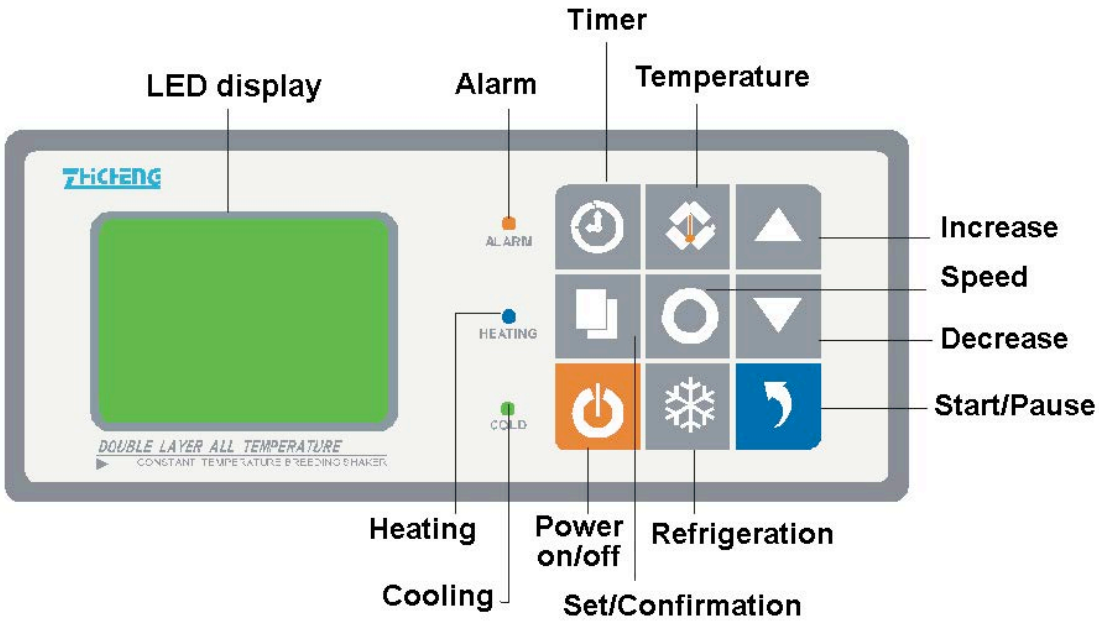
## 2. Unit Description

ZHWY-2102/2112 series Two Layers Incubator Shakers are designed for large capacity growth of biological organisms under optimum conditions of temperature, time and agitation. These microprocessor controlled incubator shakers offer a number of advanced features include user-friendly digital setpoints keypad, overtemperature alarm and self-correcting feedback controls on temperature and shaking speed.

### Features in Summary

- Powerful triple eccentric drive mechanism guarantees a lifetime of smooth and continuous shaking motion.
- A P.I.D microprocessor controller maintains precise temperature and shaking speed.
- User-friendly sealed keypad allows easy digital setting on running time, speed, and optimum temperature condition.
- Large, easy-to-read LCD display presents a menu of functional readouts.
- Automatic shutoff at end of study via electronic timer, adjustable from 1 minute to 500 hours.
- Automatic shutoff of shaker when lid is opened which ensures operator safety.
- Non-volatile memory retains setpoints during a power failure and restarts shaker automatically.
- Alarms programmed to warn of setpoints deviation and to indicate when timer operation has expired.
- A high volume air circulation system maintains optimum temperature uniformity, as well as providing maximum oxygen transfer.
- See-through chamber door provides complete visibility and minimize the need to open the chamber frequently.
- Mirror-finished stainless steel interior provides excellent durability and an easy-to-clean surface.

## 3. Control Panel




## 4. Starting the Unit

Turn on the power to the unit by pressing the **Main Switch** located on the right side of the unit body, the unit enters into the running mode. All keys on the control panel are activated in the running mode. The LED Display shows the preset temperature, speed, timer and finally, measured temperature. Press the **Start/Pause** key, the unit will operate on the preset parameters. Second press the **Start/Pause** key while the unit is running stops the operation. Holding the **Power On/Off** key for more than 3 seconds, the unit is powered off.

## 5. Temperature Control

Temperature of the unit can be set from ambient-20°C to 60°C. Temperature setting is completed by the following steps:

1. Press the **Set/Confirmation** key, then press the **Increase** key to enter the password **3**.
2. Press the **Temperature** key, the unit enters into temperature setting mode. Temperature value can be set via the **Increase/Decrease** key. To confirm the new setting, press the **Set/Confirmation** key.

Setting of a new value overwrites the old value in the memory.

## Refrigeration

Press the **Set/Confirmation** key, then press the **Increase** key to enter the password **9**. Press the **Refrigeration** key, the unit enters into refrigeration setting mode. Refrigeration parameter can be set via the **Increase/Decrease** key. To confirm the new setting, press the **Set/Confirmation** key.

- If the unit is to be used in the temperature range of ambient-5°C to ambient+5°C, the refrigeration parameter can be set at the value **0.2**.

- If the unit is to be used in the temperature range of ambient-20°C to ambient-5°C, the refrigeration parameter can be set at the value **0.5**.

- If the unit is to be used in the temperature range of ambient+5°C to 60°C, the refrigeration parameter can be set at the value **2**. The refrigeration is cancelled.

## 6. Overtemperature Alarm

In case the gap between measured temperature and setting temperature excels ± 3°C, the unit sends out audible and visible alarm automatically, and the yellow alarm indicator flashes. The platform keeps on shaking while the heating or refrigeration stops. Press the **Temperature** key will cancel the alarm for 30 minutes. Reset the temperature value, the unit exits the alarm mode.

## 7. Speed Control

To set the desired shaking speed, first press the **Set/Confirmation** key, then press the **Increase** key to enter the password **3**. Press the **Speed** key, the unit enters into speed setting mode. The desired speed value can be set via the **Increase/Decrease** key. To confirm the new setting, press the **Set/Confirmation** key. Setting of a new value overwrites the old value in the memory.

## 8. Timer

When timer function is needed, first press the **Set/Confirmation** key, then press the **Increase** key to enter the password **3**. Press the **Timer** key, the unit enters into timer setting mode, the desired timer value can be set via the **Increase/Decrease** key. To confirm the new setting, press the **Set/Confirmation** key.

By the time the remaining time reaches 0:00, the platform stops shaking, the unit sends out audible and visible alarm for 2 minutes. Press the **Timer** key, the alarm will be muted.

## 9. Defrosting

Operation the unit at a low temperature for a long period of time causes the buildup of frost, which degrades the freezing performance and may disable the temperature from being controlled at the setpoint. The defrosting function guarantees the unit to operate smoothly and continuously in such a case. Defrosting function is set via the following steps:

- First press the **Set/Confirmation** key, then press the **Increase** key to enter the password **9**. Press the **Refrigeration** key, the unit enters into refrigeration mode (first stage).
- Press the **Refrigeration** key again, the unit enters into defrosting timer setting mode (second stage). Defrosting timer value can be set via the **Increase/Decrease** key.
- Press the **Refrigeration** key once more, the unit enters into defrosting time period setting mode. Defrosting time period can be set via the **Increase/Decrease** key.
- To confirm the new setting, press the **Set/Confirmation** key.

**Defrosting Timer Setting** refers to the function by which the unit starts defrosting every given time period. For example, if the defrosting timer value is set at 1, the unit starts defrosting every 1 hour. If the defrost timer value is set at 2, the unit starts defrosting every 2 hour. However, if the defrost timer value is set at 0, the unit does not start defrosting at all.

**Defrosting Time Period** refers to the **time span** from the moment the unit starts defrosting till it exits defrosting mode. For example, if the defrosting time period is set at 1, the unit will defrost for 1 minute. If the defrosting time period is set at 2, the unit will defrost for 2 minutes.

Due to the specific application conditions, the defrosting timer value and defrosting time period may vary greatly. However, the following values can be viewed as a starting point or general rule.

Defrosting Timer Value: 6
Defrosting Time Period: 3

If the above values are set, the unit will defrost for 3 minutes every 6 hours under refrigerated operation. During defrosting, the water tray enclosed in the package must be taken out for fetching the melted water.

## 10. Non-volatile Memory Function

Non-volatile memory retains parameters during a power interrupt and restarts the incubator shaker automatically. Non-volatile Memory Function can be set by the following steps:

1. First press the **Set/Confirmation** key, then press the **Increase** key to enter the password **5.**
2. Press the **Timer** key, the unit enters into non-volatile memory setting mode. The LED indicator displays ON/OFF options.
3. Press the **Increase/Decrease** key to choose between ON and OFF. When ON is selected, the non-volatile memory function is started. When Off is selected, the memory function is canceled.

## 11. Technical Specifications

| Item | Incubator Shaker | Incubator Shaker | Incubator Shaker | Incubator Shaker |
|---|---|---|---|---|
| Model | ZHWY-2102 | ZHWY-2102C | ZHWY-2112B | ZHWY-2112F |
| Performance | Heated and Refrigerated | | Heated and Refrigerated | |
| Temperature Range | Ambient: -20°C to 60°C | | Ambient: -20°C to 60°C | |
| Temperature Set Division | ±0.1°C | ±0.1°C | ±0.1°C | ±0.1°C |
| Temperature Uniformity | ±1°C | ±1°C | ±1°C | ±1°C |
| Shaking Speed | 60-300 rpm (±1rpm) | 60-300 rpm (±1rpm) | 60-300 rpm (±1rpm) | 60-300 rpm (±1rpm) |
| Timer | 0-500 hours | 0-500 hours | 0-500 hours | 0-500 hours |
| Capacity | 50mlx90 or 100mlx90 or 250mlx56 or 500mlx48 or 750mlx36 or 1000mlx30 | 50mlx48 or 100mlx48 or 250mlx30 or 500mlx24 or 750mlx18 | 50mlx154 or 100mlx154 or 250mlx90 or 500mlx70 or 750mlx56 or 1000mlx36 | 50mlx154 or 100mlx154 or 250mlx90 or 500mlx70 or 750mlx56 or 1000mlx36 |
| Platform Size | 734x458 mm | 500x350 mm | 970x560 mm | 940x580 mm |
| Overall Size | 700x590x1230 mm | 950x710x1250 mm | 1200x820x1600 mm | 1200x820x1600 mm |
| Electrical Requirement | 240V 50Hz | 240V 50Hz | 240V 50Hz | 240V 50Hz |
| Weight | 235Kg | 150Kg | 456Kg | 486Kg |
| Warranty | 1 year | 1 year | 1 year | 1 year |

## 12. Trouble-Shooting

| Problem Description | Possible Causes | Solutions |
|---|---|---|
| Non-running of unit, no display of LED indicator | Failure of power supply | Proper wiring of the unit |
| | Damage of fuse | Replace the fuse |
| No display of LED indicator, however the unit is running | High frequency interference from other equipments | Use dedicated line for the unit |
| Wide fluctuation of temperatures | Refrigeration parameters not correctly set | Reset the parameters |
| Measured temperature is above preset value Frequent overtemperature alarming | Preset temperature value too high | Remove the wind inlet cover at the back of the unit or set the refrigeration value to 0.5 |
| High Noise Level | Unit is not placed on flat floor | Place the unit on flat floor |
| | Platform unsecure | Fasten the four knobs on the platform |
| | Flask clamps unsecure | Fasten the nuts of flask clamps |

## 13. Packing List

Upon receipt of the unit, examine if there is any damage done to the unit during transportation. In the event of shipping damage, a claim must be filed with the transportation carrier within 7 days of receipt.

Remove the packing material from the box, take care that the accessories are not thrown away with the packing material. Lift the unit out of the box. **Do not lift the unit by the door handle!** Check all the items have been received. Included in the box should be the following:

| Item | Quantity |
|---|---|
| Main unit | 1 |
| Platform | 2 |
| Power cord | 1 |
| Fuse | 2 |
| Tool for changing platforms | 1 |
| Water tray | 1 |
| Instruction Manual | 1 |